Effect of weight reduction on severity of lower urinary tract symptoms in obese men with benign prostatic hyperplasia

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KEY MESSAGES

1. A minor change in body mass index does not affect lower urinary tract symptoms, including subjective symptom scores and objective uroflowmetry variables.
2. More effort is needed to optimise the implementation of weight reduction programmes with respect to lower urinary tract symptom improvement in real life.

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Introduction

The aetiology of lower urinary tract symptoms (LUTS) extends beyond prostate enlargement and bladder outlet obstruction. There are multiple pathways that precipitate LUTS onset and progression and make its diagnosis and treatment a challenge. It has been suggested that obese men are more likely to have LUTS and that weight gain worsens LUTS. It is not known whether weight reduction can improve LUTS. The proposed association of obesity with LUTS remains controversial. We conducted a prospective randomised controlled trial to determine whether weight reduction is an effective intervention for LUTS, and assessed the association between obesity and LUTS among patients with benign prostatic hyperplasia.

Materials and methods

This prospective randomised controlled study was approved by the local ethics and research committee. Written informed consent was obtained from each participant. Obese men aged above 50 years who attended our urology clinic for LUTS were enrolled. Details of the inclusion/exclusion criteria are listed in Table 1.

The study duration was 52 weeks. Standardised alpha-adrenergic blocker therapy (tamsulosin 0.4mg oral-controlled absorption system) for benign prostatic hyperplasia / LUTS was provided for run-in. Patient baseline parameters were assessed 4 weeks later. Patients were then randomised to view a video that provided general principles of and advice about weight reduction or enrol in a comprehensive weight reduction programme that included an integrated assessment, a weight reduction protocol, and medical nutrition therapy.

Patients were assessed at different time points over the course of 48 weeks using uroflowmetry and transrectal ultrasonography. The primary outcome measure was the change in International Prostate Symptom Score (IPSS). Secondary outcome measures included changes in uroflowmetry parameters, nocturia episodes, and prostate volume.

Based on our centre database of >1000 patients with LUTS, the mean total IPSS in patients with moderate to severe symptoms is 19 (standard deviation, 7). A sample size of 65 in each group would have 80% power to detect a four-point difference in means, with a 0.05 two-sided significance level and an attrition rate of 30%.

Descriptive statistics were used for demographic data, uroflowmetry results, prostate volume, IPSS, quality of life (QoL) score, and body mass index (BMI). Comparison of continuous data between the two groups was performed with T test or ANOVA test if the data were normally distributed, and Mann-Whitney *U* test or Kruskal-Wallis test if the data were ordinal or skewed. A P value of <0.05 was considered statistically significant.

Results

Of 180 patients assessed for eligibility, 50 were excluded and 130 were randomised to receive general weight reduction advice (n=65) or comprehensive weight reduction programme (n=65); 117 of them completed the study (Fig). The two groups were comparable at baseline in terms of age, BMI, IPSS, prostate volume, and uroflowmetry parameters (Table 2).

TABLE 1. Inclusion and exclusion criteria

Inclusion criteria
1. Men aged ≥50 years
2. Body mass index of 25-35 kg/m^2
3. Moderate to severe lower urinary tract symptoms (International Prostate Symptom Score >7)
4. Maximal flow rate of 5-15 mL/s, post-void residuals of <150 mL
5. Transrectal ultrasonography showing prostate volume >30 cc
Exclusion criteria
1. Patients with urethral stricture, neurogenic bladder or structural abnormality
2. Patients with long-term catheterisation or intermittent self-catheterisation
3. Patients with prostate cancer or bladder cancer
4. Patients prescribed 5α-reductase inhibitors, phytotherapy, or hormonal therapy
5. Patients who cannot tolerate tamsulosin oral-controlled absorption system
6. Patients with poor cardiac status (New York Heart Association class III or above) or other medical conditions in whom an intense exercise or weight reduction programme was inappropriate.

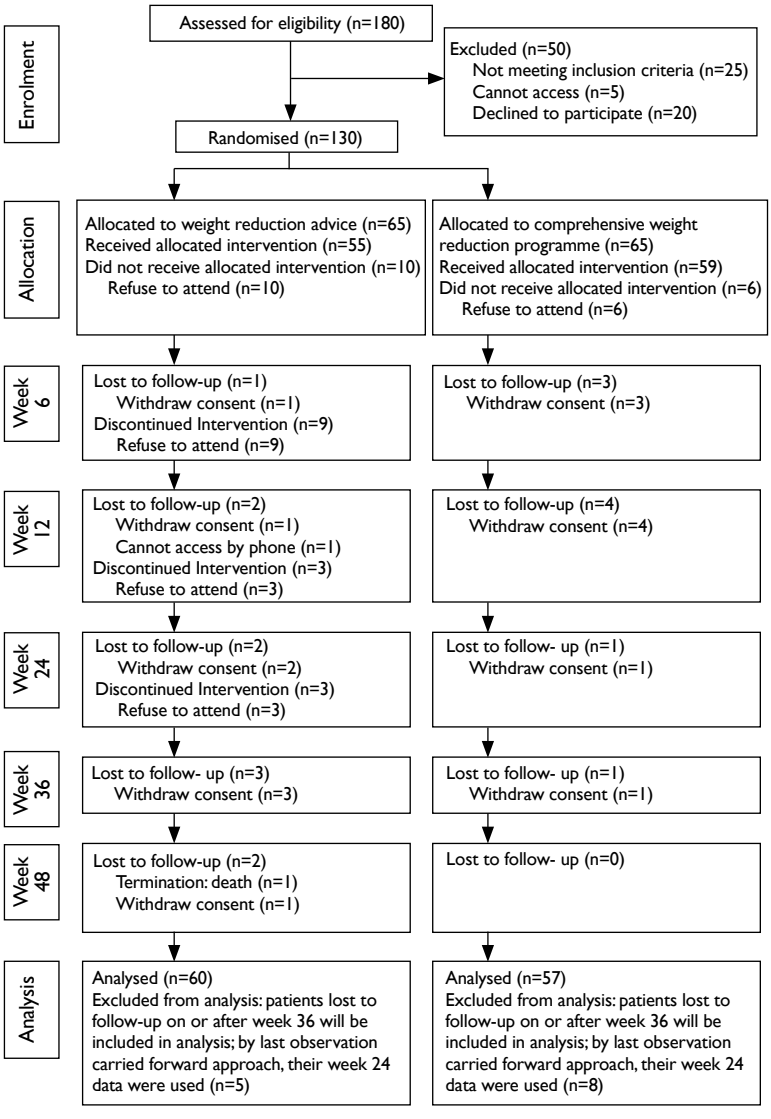

FIG. Study flowchart

After 48 weeks, the mean change in BMI was -0.4±0.9 and -0.4±0.8 kg/m^2 for the control and active group, respectively. The two groups did not differ significantly in terms of changes in nocturia episodes, total IPSS, IPSS irritative score subset, EuroQol visual analogue scale, maximal flow rate, or post-void residuals. Both groups had an increase in prostate volume although not significantly.

To determine if there was a relationship between obesity and LUTS, patients were categorised as BMI 25 to <30 kg/m^2 (n=101) or BMI 30-35 kg/m^2 (n=13) [Table 2]. The two groups did not differ significantly at baseline in terms of nocturia episodes, total IPSS, IPSS irritative score subset, IPSS QoL score, EuroQol visual analogue scale, or uroflowmetry parameters.

Patients who had lost weight during the study period were categorised into four quartiles according to their weight reduction percentage. The four groups did not differ significantly in LUTS parameters or total IPSS.

Discussion

The relationship between obesity and LUTS remains controversial. A positive correlation between obesity and the incidence of LUTS was reported in a western study.[1] Nonetheless, such a relationship was not demonstrated in our study or another.[2] These contradictory results may be partly due to the different degree of obesity in different studies. In the western study,[1] patients with BMI ≥35 kg/m^2 were compared with those with BMI 23 to <25 kg/m^2. In Asian populations, there are relatively fewer men who are severely obese (BMI 35 to <40 kg/m^2) or morbidly obese (BMI ≥40 kg/m^2). In our cohort, 101 patients were overweight (BMI 25 to <30 kg/m^2) but only 13 patients were obese (BMI 30-35 kg/m^2).

TABLE 2. Comparison of patients who received general weight reduction advice (control) or comprehensive weight reduction programme (active) and those with body mass index (BMI) 25 to <30 or 30 to 35 kg/m^2

Parameter*	Control (n=57)	Active (n=60)	P value	BMI (kg/m^2)		P value
				25 to <30 (n=101)	30-35 (n=13)	
Age (years)	63.3±7.8	66.5±6.9	0.88	66.9±7.1	62.5±7.7	0.04
Weight (kg)	75.2±6.6	74.3±8.4	0.53	73.7±6.4	84.0±9.3	>0.01
Height (m)	1.66±0.05	1.65±0.07	0.51	1.65±0.06	1.64±0.08	0.39
BMI (kg/m^2)	27.4±1.9	27.3±2.0	0.51	27.0±1.4	31.2±1.5	>0.01
Nocturia episodes	2.5±1.2	2.6±1.2	0.63	2.5±1.2	2.7±1.4	0.61
Total International Prostate Symptom Score (IPSS)	17.6±6.3	17.3±6.9	0.80	17.4±6.6	17.2±6.8	0.93
Irritative score (sum of score of IPSS questions 2, 4, and 7)	7.6±3.3	8.1±2.9	0.44	7.8±3.1	8.0±3.6	0.82
IPSS quality of life score	3.3±0.9	3.2±1.2	0.52	3.3±1.0	2.8±1.5	0.13
EuroQol visual analogue scale	73.8±15.8	74.5±13.8	0.81	75.1±14.1	65.8±18.9	0.11
Maximal flow rate (mL/s)	10.4±4.3	10.2±3.9	0.81	10.0±3.4	12.2±6.9	0.46
Post-void residuals (mL)	57.6±79.2	37.5±48.1	0.27	51.5±68.5	24.8±36.2	0.23
Prostate size (cc)	52.1±23.2	56.6±31.1	0.89	56.8±28.4	40.1±15.3	0.03
Prostate specific antigen (μg/L)	4.21±4.62	5.14±5.17	0.27	5.0±5.1	2.6±2.6	0.07

* Data are presented as mean±SD

Without a significant difference in BMI, a subtle relationship between obesity and LUTS may not be demonstrated.

The degree of weight change with respect to LUTS development has been reported.[3] The baseline mean BMI was 26.9 (24.5-29.4) kg/m^2, and the mean change in BMI after 4 years was 1.4 (0.3-2.5) kg/m^2. Modest weight loss and weight gain were not associated with changes to the American Urological Association Symptom Index score, and the rate at which the score changed did not vary with the occurrence of a modest weight change. A significant weight change or a significant degree of obesity might be needed to demonstrate such association.

In our study, the control and active groups did not differ significantly in weight reduction percentage. This demonstrates the challenge of getting patients to adhere to a weight loss programme. Most trials are plagued by subsequent weight regain. Even within weight loss trials of continual intervention, weight regain is prominent. To improve the success of a weight reduction programme, more innovative measures are needed.

Conclusion

The association between obesity, weight loss, and LUTS was not demonstrated. This could be due to the less marked weight difference and weight loss in our cohort. Although weight reduction might be an effective measure to improve LUTS, the implementation of a successful weight reduction programme remains a challenge.

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